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ABSTRACT

This paper describes the methodology used by The College of St. Rose (New York) to identify peer institutions (similar small private liberal arts colleges) as part of a comparative compensation survey. To identify peer institutions, researchers used a hybrid approach involving both objective identification of institutions and administrator knowledge of similar institutions. Cluster analysis using 33 institutional descriptors and a 16-cluster solution was applied to schools listed in major compendia about higher education for an objective listing. Descriptors covered the categories of membership, size, quality, price, and finance. The resulting list was submitted to the College administration to ensure the list reflected the mission and objectives of the College. Limited resources, practical constraints and political realities of the institution were the motivating factors influencing this approach. The study resulted in the identification of 21 peer institutions in New York State. Institutional researchers are urged to carefully select institutional descriptors in such an effort, recognize the limited statistical techniques available for data analysis, and be sensitive to the political agendas of all parties involved. (Contains 15 references.) (DB)

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Selecting Peer Institutions: A Hybrid Approach

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This paper was presented at the Thirty-Seventh Annual Forum of the Association for Institutional Research held in Orlando, Florida, May 18-21, 1997. This paper was reviewed by the AIR Forum Publications Committee and was judged to be of high quality and of interest to others concerned with the research of higher education. It has therefore been selected to be included in the ERIC Collection of Forum Papers.

Jean Endo
Editor
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Abstract

The Office of Institutional Research at The College of Saint Rose started to select peer institutions in fall, 1995, in order to identify potential participants in a planned College-sponsored compensation survey, and create an appropriate comparison group for future institutional research. As several College constituencies had already compiled their own lists of peer institutions, a hybrid approach was adopted to our task. We utilized the informed judgment of our colleagues by including institutions from their lists as part of our target population, and creating a variable called list membership to quantify their view. With more comprehensive data coverage based on some major compendia about higher education, we conducted a cluster analysis so as to build our selection procedure on an objective basis. Lastly, we sought administrator input to ensure that our final product would reflect the mission and objectives of the College. Because our hybrid approach made full use of the available information, the peer group we developed has been well received at the College.

This paper summarizes the experience of a small, private, liberal arts college seeking a peer institution analysis with limited resources, practical constraints and political realities.

Selecting Peer Institutions: A Hybrid Approach

A comparison of an institution with its peers is usually of great importance to its strategic planning and decision-making (Teeter & Brinkman, 1992). This is especially so for a small tuition-dependent private college in an era of increasing challenge and competition in higher education. Faced with the difficult task of balancing its ever-expanding financial needs with harsh reality, such an institution is obliged to take note of its peers' behavior before addressing the recurring issue of how to maintain its competitive edge with its modest resources.

The College of Saint Rose is a private, coeducational institution in Albany, New York. With an average enrollment of 3,800, it now offers more than 50 degree programs at both undergraduate and graduate levels. Although the College has developed rapidly in the past ten years or so, tuition remains it major source of revenue.

Created in summer, 1995, the Office of Institutional Research started to develop a peer group for the College that fall when we were charged with the task of conducting an administrative and staff compensation survey, so that the administration could make an informed decision when preparing the following year's budget. Prior to that time, the College did not have an official list of peer institutions. On the other hand, several College constituencies had each developed their own versions of comparable institutions through years of operation and research in their own fields. In such a situation, it was apparent that when we embarked on our efforts to identify our peer institutions, we should pay due attention to our colleagues' previous findings, which reflected their best insight into the common characteristics defining our college and its peers in some specific areas. In the meantime, we should broaden our horizon and adopt a more

objective approach so as to provide the administration with a more reliable and balanced view of our peer institutions, and avoid frequent future revisions when our research shifts its focus.

This paper reviews the literature on peer institutions, describes the hybrid approach we used for the selection of our peer group, and discusses the results and implications of our comparative study.

Literature Review

Institutional comparison is not a new phenomenon in higher education. For decades, administrators have been checking their institutions' academic strength and financial health from time to time by examining their standing on a number of variables across a group of colleges and universities regarded as their equals. This practice has gradually become institutionalized since the early 1980s when more and more institutions began to feel the pressure to "use external sources as a means to rationalize their activities" (Teeter & Christal, 1987, p. 8). A successful institutional comparison results from an appropriate selection of a group of institutions similar to the home institution on an array of relevant measures. Although institutional comparison is regarded as a viable management tool by many administrators and researchers (Brinkman & Teeter, 1987), the growing interest in defining one's peers can be largely traced back to factors such as financial constraints, pressures for accountability, and a lack of recognized performance standard on the part of external agencies (Teeter & Christal, 1987).

While peer groups have almost become synonymous with institutional comparison, there are other types of comparison groups that also deserve institutional researchers' attention. According to Teeter and Brinkman (1992), comparison groups can be classified into four categories depending on the purpose of comparison: competitor, aspiration, predetermined, and peer. A competitor group includes institutions that compete with one another for students,

faculty, or funding regardless of their dissimilarities in role and scope. An aspiration group consists of institutions that can serve as models of emulation despite the differences between this group and the home institution. A predetermined group is composed of institutions that are grouped together because of externally-imposed natural, traditional, jurisdictional, or classification-based factors. A peer group is comprised of institutions that resemble the home institution in role, scope, or mission. This classification of comparison groups provides institutional researchers with a useful theoretical framework that captures the essence of institutional comparison in its various forms.

Procedures for identifying peer groups vary with the weights assigned to data, statistics, and judgment for institutional comparison. In Teeter and Brinkman's (1992) typology, a continuum of such procedures has cluster analysis at one end, which relies heavily on data and statistics, and panel review at the other, which depends mainly on judgment (i.e., administrator input). Between these opposing ends of the continuum stand the hybrid approach and the threshold approach. The hybrid approach combines data, statistics, and judgment, and the threshold approach utilizes data and judgment.

Of all the procedures available for developing peer groups, cluster analysis seems to be most attractive to data-oriented institutional researchers for two reasons. First, it can handle a large number of institutional descriptors simultaneously. Second, it substitutes model-based calculations for arbitrary judgments about cut-off points for the interval variables in the classification of institutions (Brinkman & Teeter, 1987). An inspection of the literature indicates that this statistical technique emerged as a tool for institutional comparison as early as 1980 when Terenzini, Hartmark, Lorang, and Shirley at University at Albany published the results of their institutional comparison. A partial list of subsequent studies along this line includes Elsass and

Lingenfelter (1981), Glover and Mills (1989), Korb (1982), and Szelest (1996). Cluster analysis is a multivariate statistical technique for the reorganization of a set of entities into relatively homogeneous groups or clusters (Aldenderfer & Blashfield, 1984). A typical clustering algorithm such as agglomerative hierarchical cluster analysis starts with a measurement of the distances among individual cases in terms of all the variables involved, and then proceeds to cluster cases that have the smallest distance (i.e., largest similarity) between them. This process continues as the number of clusters increases, and it will not terminate until all cases become members of a single cluster (Norusis, 1993). For purposes of institutional comparison, cluster analysis is often supplemented by factor analysis and discriminant analysis (Brinkman & Teeter, 1987). As a powerful data reduction tool, factor analysis can be used at the preliminary stage of the study to identify factors underlying the available data, and generate factor scores to replace the original variables for a subsequent cluster analysis. On the other hand, discriminant analysis can verify the results from cluster analysis by checking the model-data fit and assessing the influence of individual factors or variables (Brinkman & Teeter, 1987).

Although cluster analysis has proved to be a useful means to seek objectivity in institutional comparison, it still depends on subjective decisions in assigning weights to the variables and choosing a solution to group the cases. Furthermore, data standardization in the procedure will unnecessarily increase the weight of those variables that display the largest variance (Brinkman & Teeter, 1987). Considering the limitations of this statistical approach and the richness of the administrator input that may not formally exist in any database, it is not unwise to select a hybrid approach in institutional comparison. Hybrid approaches can be as diversified as the particular procedures incorporated in the comparison. For instance, when identifying peer groups for the institutions under its jurisdiction, the Kansas Board of Regents solicited campus

officials' involvement in finalizing the list of candidate institutions for statistical analysis (Cleaver, 1981). In a different setting where the assessment of the institution's enrollment and financial strength was the major goal, University of Hartford supplemented the statistical analyses with an interactive decision support system based on case study reviews (Glover & Mills, 1989). Despite their apparent differences, these studies shared one salient feature: judgmental procedures were introduced to enhance the validity of statistical analyses.

Based on a review of the literature and an assessment of our options, we decided to adopt a hybrid approach to our task. Although previous studies provided no specific guidelines for small institutions in developing peer groups, we considered data analysis and administrator input of equal importance to our identification of peers. Quantitative procedures could enhance the objectivity of our comparison, and the expert opinions of our colleagues at both the college and the department levels could help increase our awareness of the facts and issues relevant to our selection procedure.

Method

Data Sources

Because of time and other practical constraints, data used in our study were mainly extracted from some major compendia about higher education compiled by publishers and national organizations. These compendia are summarized in Table 1.

Population

In view of the limitations of our resources, we restricted ourselves to a moderate-sized pool of prospective peer institutions. Two types of colleges and universities were candidates: (a) 47 institutions that had either appeared in the comparison lists of certain College constituencies, or participated in the institutional studies the College conducted in the previous

Table 1

Compendia About Higher Education Used as Data Sources

Editor and Title	Publication Date	Publication Information
The College Handbook 1995	1994	New York: College Entrance Examination Board.
Peterson's Guide to Four-year Colleges 1996	1995	Princeton, NJ: Peterson's Guides
Peterson's Guide to Two-year Colleges 1996	1995	Princeton, NJ: Peterson's Guides.
Peterson's Guide to Graduate and Professional Programs: An Overview 1995	1995	Princeton, NJ: Peterson's Guides.
American Universities and Colleges (14th ed.)	1992	New York: Walter de Gruyter.
A Classification of Institutions of Higher Education (1994 ed.)	1994	Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.
Rodenhouse, M. P. (Ed.). The HEP 1993 Higher Education Directory	1993	Falls Church, VA: Higher Education Publications.

few years, and (b) 21 additional private master's institutions in New York (excluding New York City), Massachusetts, and Pennsylvania listed in The HEP 1993 Higher Education Directory that enrolled 1,500 to 6,000 students and charged less than $12,000 for full-time undergraduate tuition and fees, when our college's corresponding numbers were reported to be 3,617 and $8,916. The selection of the three states as the geographical location of the second type of potential peers was based on the consideration that New York and Massachusetts had similar disposable personal incomes per person ($20,948 and $20,985 respectively) (Statistical abstract of the United States: 1994 (114th ed.), 1994), and that Pennsylvania institutions were emphasized by the faculty salary survey conducted by the College for the 1994 Middle States Self-Study.

Variables

As the initial selection of variables in identifying a peer group can determine the validity of its results, we decided to focus on institutional characteristics of most interest to the College administration. After carefully examining the major management concerns at both college and department levels, we arrived at a preliminary list of 33 variables presented in Table 2 as institutional descriptors for our project.

The membership variables were included to measure the diversity and relevance of those institutions that were historically considered our peers. The Carnegie Group variable was split into two in the subsequent analysis: Carnegie Group 1 and Carnegie Group 2. These two variables were assigned special values summarized in Table 3 to bring out the following two contrasts: (a) Master's Colleges and Universities I versus Master's Colleges and Universities II and Baccalaureate Colleges I, and (b) Master's Colleges and Universities I and II and Baccalaureate Colleges I versus all other Carnegie categories. The variable of Geographical Location was assigned the value of "1" or "0" depending on whether a certain institution was located in New York, Massachusetts, and Pennsylvania or not. As to the variable of Saint Rose Comparison List, we entered the frequency of occasions when an institution either appeared in a Saint Rose comparison list or became involved in a College-sponsored study.

While the membership measures represented our efforts to integrate the preexisting in-house data with our study, the remaining measures allowed us to examine our potential peers more objectively on a series of institutional descriptors meaningful to the College administration. The size variables covered the areas of academic majors, enrollment, faculty, and library holdings. The quality variables served as indicators of admissions selectivity, institutional output, resource utilization, and faculty qualification. The price variables measured tuition and fees as well as room

Table 2

Institutional Descriptors Initially Selected for Developing a Peer Group

Category	Variable
Membership	Carnegie group
	Geographical location
	Saint Rose comparison list
Size	Number of associate majors
	Number of undergraduate majors
	Number of graduate majors
	Undergraduate full-time enrollment
	Undergraduate part-time enrollment
	Graduate full-time enrollment
	Graduate part-time enrollment
	Number of undergraduate full-time faculty
	Number of undergraduate part-time faculty
	Number of graduate full-time faculty
	Number of graduate part-time faculty
	Library book holdings
	Library periodical holdings
Quality	Percentage of students admitted with SAT I verbal scores above or equal to 500
	Percentage of students admitted with SAT I math scores above or equal to 500
	Undergraduate acceptance rate
	Undergraduate retention rate
	Undergraduate 6-year graduation rate
	Undergraduate student-faculty ratio
	Average class size in undergraduate required courses
	Percentage of undergraduate full-time faculty terminal degree holders
Price	Undergraduate full-time tuition and fees
	Undergraduate part-time tuition by credit
	Undergraduate part-time fees
	Graduate full-time tuition
	Graduate part-time tuition by credit
	Graduate fees
	Room and board
Finance	Total current funds revenues
	Total current funds expenditures and mandatory transfers

Table 3

Contrast Coding for Carnegie Group Membership

Institution	Carnegie Group 1	Carnegie Group 2
Master's Colleges and Universities I	1	1
Master's Colleges and Universities II and Baccalaureate Colleges I	-1	1
All Other Carnegie Categories	0	-2

and board charges. Finally, the finance variables addressed the issue of financial health. Except for finance variables, whose measures came from American Universities and Colleges (14th ed.), the relevant data for all the variables were collected from The College Handbook 1995, Peterson's Guide to Four-year Colleges 1996, Peterson's Guide to Two-year Colleges 1996, and Peterson's Guide to Graduate and Professional Programs: An Overview 1995.

Data Screening

The collected data were screened before the statistical analysis. As our data set only included 68 cases on 33 variables, considerably smaller than the required sample size of "at least five cases for each observed variable" (Tabachnick & Fidell, 1989, p. 603), factor analysis was not used as a preliminary data reduction means in our analysis. Besides, since there was no consensus among institutional researchers as to the weight each variable or factor should receive in institutional comparison, we decided to assign all the variables an equal weight in the subsequent data analysis, believing that their presence in the data set had already reflected the importance the College administration would attach to them.

As a result of an initial data inspection, we decided to exclude one local institution

(Regents College) from our data set as an outlier because of its unique institutional characteristics. Three variables (i.e., undergraduate part-time fees, graduate full-time tuition, and graduate fees) were also dropped in consideration of the magnitude of their missing values and within-group variation. Finally, when necessary, we substituted a missing value with the average value of the cases that belong to the same Carnegie group as the one in question.

Cluster Analysis

The hierarchical clustering method as implemented in SPSS for Windows: Professional Statistics (Release 6.0) was our major tool for statistical analysis. In order to minimize the effect of variables measured on different scales, we first transformed all the data values to z scores. Although a small number of our variables were qualitative measures, they were treated as if they were quantitative attributes, since the results of a cluster analysis would not be very sensitive to this kind of treatment (Romesburg, 1984). Assuming that all the data were interval in nature, we then measured the dissimilarities between any two individual institutions by computing their squared Euclidean distance, which equaled the sum of the squared differences between the values for the two cases. Average linkage between groups (UPGMA) was chosen as the clustering method so that the average of the distances between all possible pairs of cases in two clusters were used as a criterion to determine the formation of a new cluster (Norusis, 1993). Finally, to identify a preliminary peer group of a manageable size, we selected a 16-cluster solution after comparing several other alternatives. This enabled us to identify 32 candidate institutions for further investigation. A follow-up discriminant analysis was not performed owing to a concern over the inadequate sample size.

Administrator Input

Before the peer list was finalized, the tentative results from the cluster analysis were submitted to the College administration for a review so that the peer group we developed would comply with the strategic vision of the College decision-makers. At their suggestion, we narrowed our attention to the 19 institutions within our own state, and added to the final list two in-state institutions that had previously been treated as our peers by some College constituencies.

Results

The peer institutions identified through our selection procedure are presented in Table 4. Because of space limitations, the table only carries ten selected institutional descriptors. An inspection of this table indicates that a typical institution The College of Saint Rose can regard as its peer is a New York State private college or university that offers 36 academic majors, enrolls 1,522 full-time undergraduate students and 359 part-time graduate students, and hires 108 full-time undergraduate faculty. It maintains an undergraduate acceptance rate of .75, a six-year undergraduate graduation rate of .68, and an undergraduate class size of 21. It charges an undergraduate tuition of $11,600. Finally, it operates with a balanced budget, with its revenues ($24,961,333) slightly exceeding its expenditures ($24,616,905).

Except for Molloy College, all the peer institutions in Table 4 have been involved in institutional comparisons at the College at least once before. They share noticeable similarities in their undergraduate acceptance rates, class sizes, and tuition charges. This is more evident if we take into consideration their respective small standard deviations of .07, 3, and $2,210, which accounts for only 10%, 14%, and 19% of their relevant means. The variable of undergraduate graduation rate also has a small standard deviation of .8. However, this could be an artifact of our heavy use of averages to replace missing values in the analysis. In terms of within-group

Table 4

Selected Institutional Descriptors of The College of Saint Rose and its Peers

Institution	Number of Under. Majors	FT Under. Enrollment	PT Graduate Enrollment	Number of FT Under. Faculty	Under. Accpt. Rate	Under. Grad. Rate	Under. Class Size	Under. Tuition	Revenues	Expenditures
Alfred Uni.	49	1830	182	160	.76	.65	18	$16,972	$39,459,000	$38,414,000
Canisius Col.	44	2978	870	200	.83	.63	22	$11,976	$42,313,000	$41,060,000
Col. New Rochelle	26	648	894	71	.66	.55	18	$12,300	$27,033,000	$27,025,000
Col. of Mt. St. Vincent	24	707	55	63	.76	.75	20	$11,790	$11,051,000	$11,126,000
D'Youville Col.	31	1074	246	83	.62	.61	30	$9,100	$12,989,000	$12,335,000
Elmira Col.	63	1099	148	66	.72	.60	20	$15,290	$18,579,000	$17,663,000
Le Moyne Col.	18	1820	0	129	.79	.79	20	$11,360	$27,797,000	$27,339,000
Manhattanvill Col.	39	830	356	76	.68	.79	20	$15,040	$20,397,000	$20,385,000
Marist Col.	45	3111	531	204	.68	.65	19	$11,682	$49,372,000	$48,639,000
Medaille Col.	28	910	0	46	.64	.73	17	$8,920	$8,174,000	$7,912,000
Molloy Col.	46	1402	77	89	.73	.73	21	$9,694	$11,857,000	$11,636,000
Mt. St. Mary Col.	21	1111	224	70	.85	.70	24	$8,420	$12,764,000	$12,222,000
Nazareth Col. of Roch.	34	1267	812	109	.81	.64	25	$11,050	$24,165,000	$23,457,000
Niagara Uni.	37	1919	333	113	.86	.53	22	$10,740	$32,226,000	$31,019,000
Russell Sage Col.	41	1009	957	125	.90	.73	20	$13,270	$26,000,000	$26,000,000
Siena Col.	23	2669	0	166	.75	.79	21	$11,110	$37,021,000	$36,818,000
St. Bonavent. Uni.	28	1744	316	123	.76	.75	22	$10,851	$32,902,000	$32,711,000
St. J. Fisher Col.	59	1675	200	106	.79	.56	24	$10,965	$24,132,000	$22,666,000
St. T. Aquinas Col.	30	1135	51	70	.78	.73	21	$9,450	$9,797,000	$9,939,000
The Col. of St. Rose	28	1698	1121	120	.70	.65	18	$10,110	$25,578,000	$25,443,000
Wagner Col.	34	1324	169	76	.71	.65	20	$13,500	$30,582,000	$33,146,000
Mean	36	1522	359	108	.75	.68	21	$11,600	$24,961,333	$24,616,905
Standard Deviation	12	699	357	45	.07	.08	3	$2,210	$11,501,708	$11,407,482

Note. An underlined number on a variable is an estimate based on the average of the cases associated with the same Carnegie group.

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dissimilarities, only the measure of part-time graduate enrollment needs our serious attention. With three colleges in the group offering no graduate education at all, this variable has a standard deviation (357) almost as large as its mean (359).

The College of Saint Rose bears a strong resemblance to the peer group as defined in Table 4. On four out of the ten institutional descriptors listed (i.e., full-time undergraduate enrollment, number of full-time undergraduate faculty, revenues, and expenditures), the difference between the College and its peers is no more than 27% of its corresponding standard deviation. The variable of undergraduate graduation rate is excluded from this category as explained above. As to the striking difference between the College and its peers on part-time graduate enrollment, the previous comment on this variable should be applicable here as well.

Discussion

The adoption of a hybrid approach to selecting a peer group proved fruitful in our institutional comparison effort. The College of Saint Rose had already owned several lists of comparable institutions when we started to construct a peer group. Since these lists often contained useful information collected from a specific area of higher education, a hybrid approach particularly fit this situation. We utilized the informed judgment of our colleagues by including institutions from their lists as part of our target population, and creating a variable of list membership to quantify their view of our peer group. With more comprehensive data coverage based on some major compendia about higher education, we conducted a cluster analysis so as to build our selection procedure on an objective basis. Lastly, we sought administrator input to ensure that our final product would reflect the mission and objectives of the College. Because our hybrid approach made full use of the available information, the peer group we developed has since been used by several College constituencies in their comparative studies.

The results from our selection of peer institutions have three implications:

First, since the outcome of a cluster analysis depends greatly on the variables selected for the procedure, caution must be exercised when choosing institutional descriptors. Our selected peer group is a relatively homogeneous body of colleges and universities based solely on the aggregated information from the 30 variables we included in the analysis. Although these institutional descriptors were viewed as the essential components of a peer framework, it can also be argued that certain institutional characteristics are either over- or under- represented in the data set if a different perspective is taken. As any alteration of the data structure may subsequently change the composition of the peer group, we should always ensure that institutional descriptors are carefully selected based on the purpose of the comparison.

Second, as it may not be very realistic for many small private institutions to start with a large pool of candidates in their search of a peer group, the choice of an appropriate statistical technique can pose a challenge to institutional researchers. Owing to practical constraints, small private institutions tend to search their own regions for peers. This will often force researchers into an unwanted situation in which the moderate size of their pool of potential peers will make the application of factor analysis and discriminant analysis virtually impossible. If researchers do not increase their pool size, they will miss the opportunity of utilizing more sophisticated analytical techniques just as we did; if they intend to create a peer group more objectively, they will have to endure the cost of a large-scaled data collection. Here the willingness to accept a trade-off seems to be the only way out. It is true that the data from the Integrated Postsecondary Education Data System (IPEDS) often lack timeliness. However, if institutional researchers can tolerate this time lag, today's computer technology will easily make a wealth of higher education data available to them, so that they can expand their data collection for more advanced statistical

analyses.

Third, as selecting a peer group can be "one of the most political processes" in institutional research (Teeter & Brinkman, 1992, p. 63), researchers need to be sensitive to the political agendas of all parties involved. Whatever procedures are adopted in institutional comparison, the selection of peer institutions is never a pure analytical exercise (Brinkman & Teeter, 1987). In order to generate a peer group politically acceptable to their clients, institutional researchers should accommodate the data requesters' goals and perspectives in their comparisons. Constituencies at The College of Saint Rose are generally receptive to the peer group we developed because their ideas of peer institutions have been systematically incorporated in our data set. In contrast, the College decision makers asked us to drop out-of-state institutions from our preliminary list, as such colleges did not fit their concept of a peer institution. All this indicates that institutional researchers must familiarize themselves with the politics of institutional comparison before they can develop politically valid peer groups.

The selection of a peer group is the most important step in institutional comparison. Considering its methodological pitfalls and political complexity, a hybrid approach to this task may represent a sensible option to many of us.

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